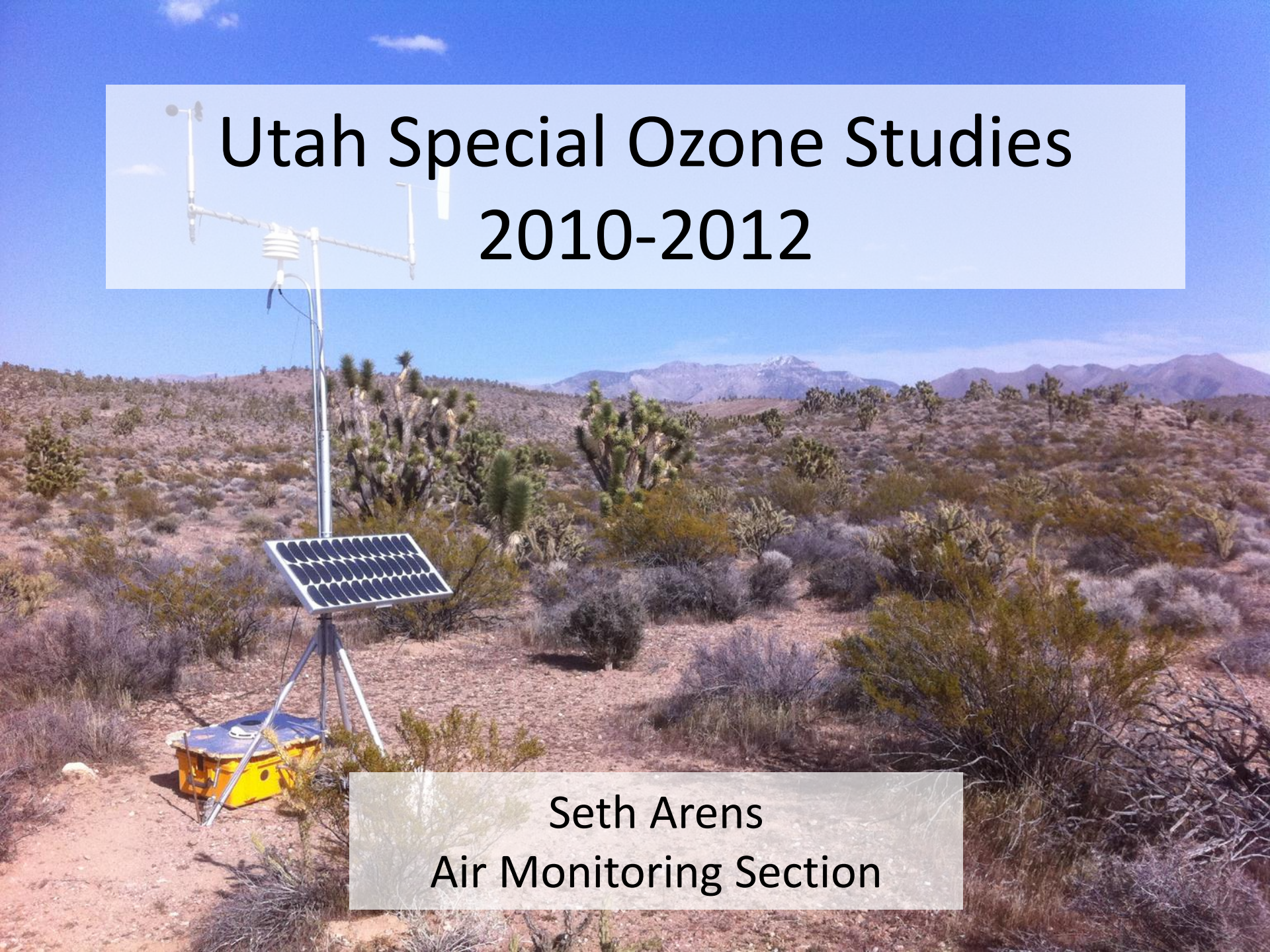
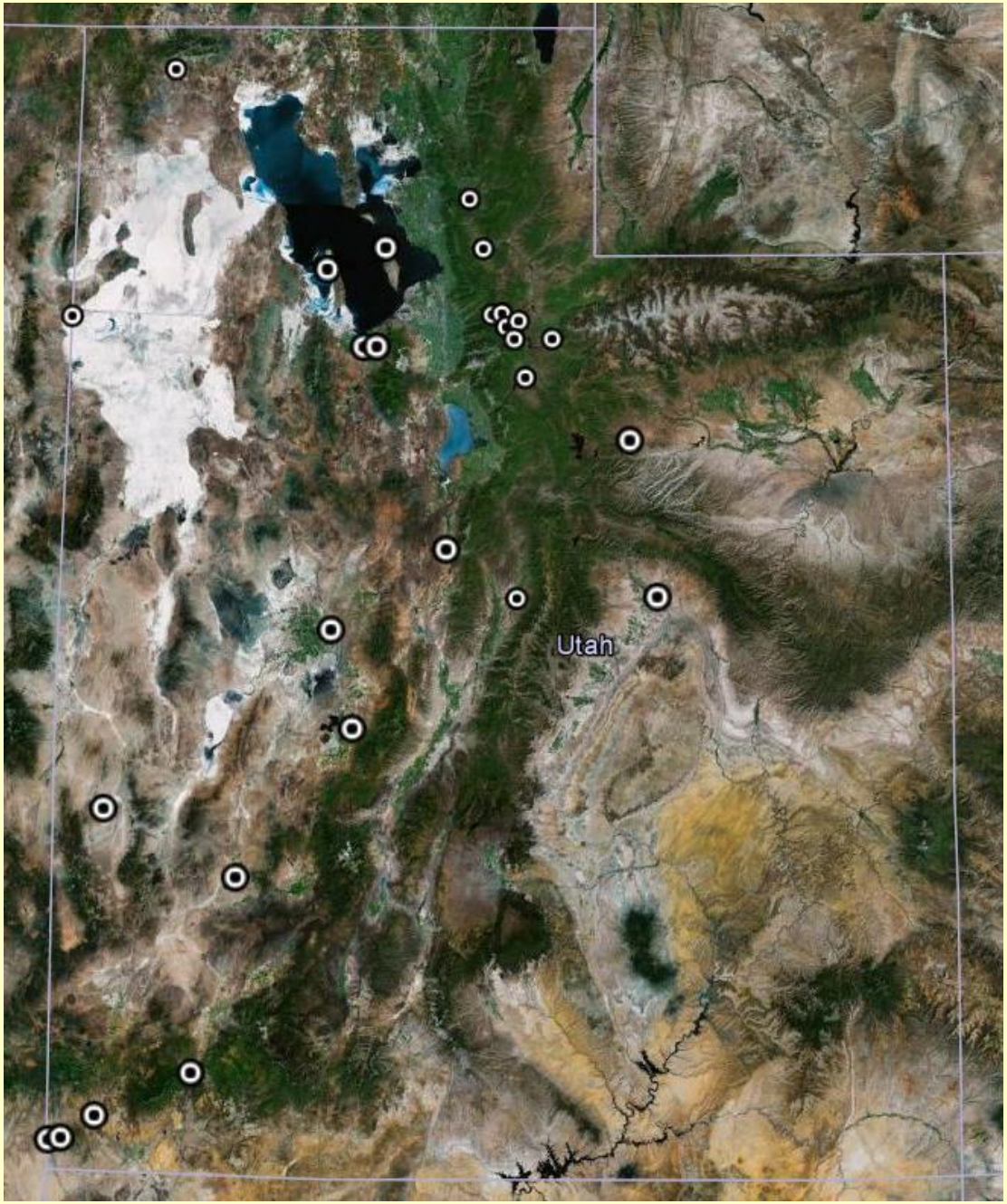
Utah Special Ozone Studies 2010-2012



Seth Arens
Air Monitoring Section

Overall Project Goals

- Assess ozone nonattainment area
- Assess rural Utah ozone
- Estimate impact of transport on Utah ozone
- Assess role of GSL on ozone formation



2010-2012

- 27 sites
  - Rural Utah
  - GSL sites
  - Mountain valleys
- 2 years at 9 sites
- 3 years at 2 sites
  - Silver Summit
  - Erda

Ozone studies in 2012

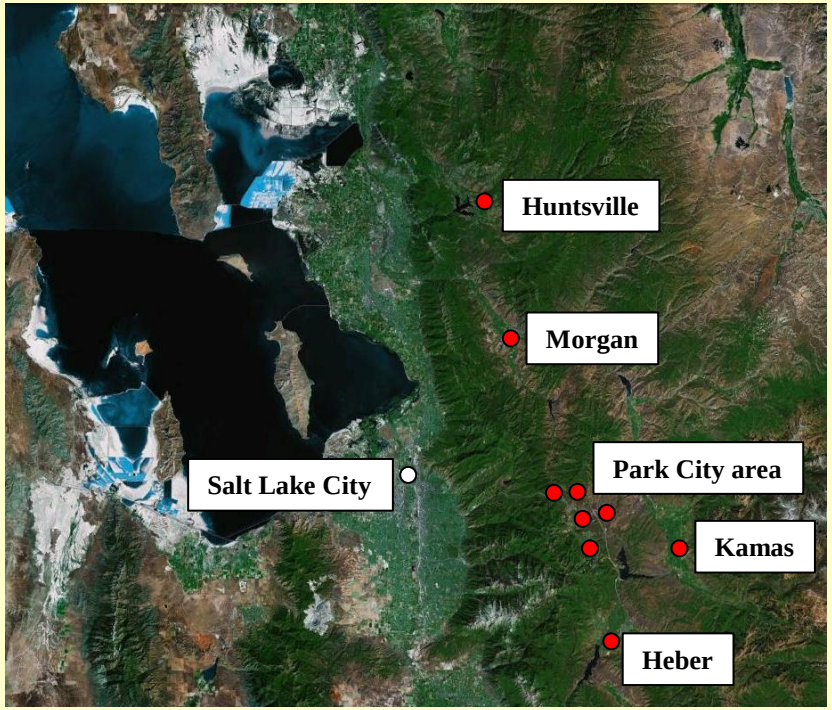
1. Mountain valley ozone saturation study
2. Tooele Valley ozone saturation study
3. Rural ozone

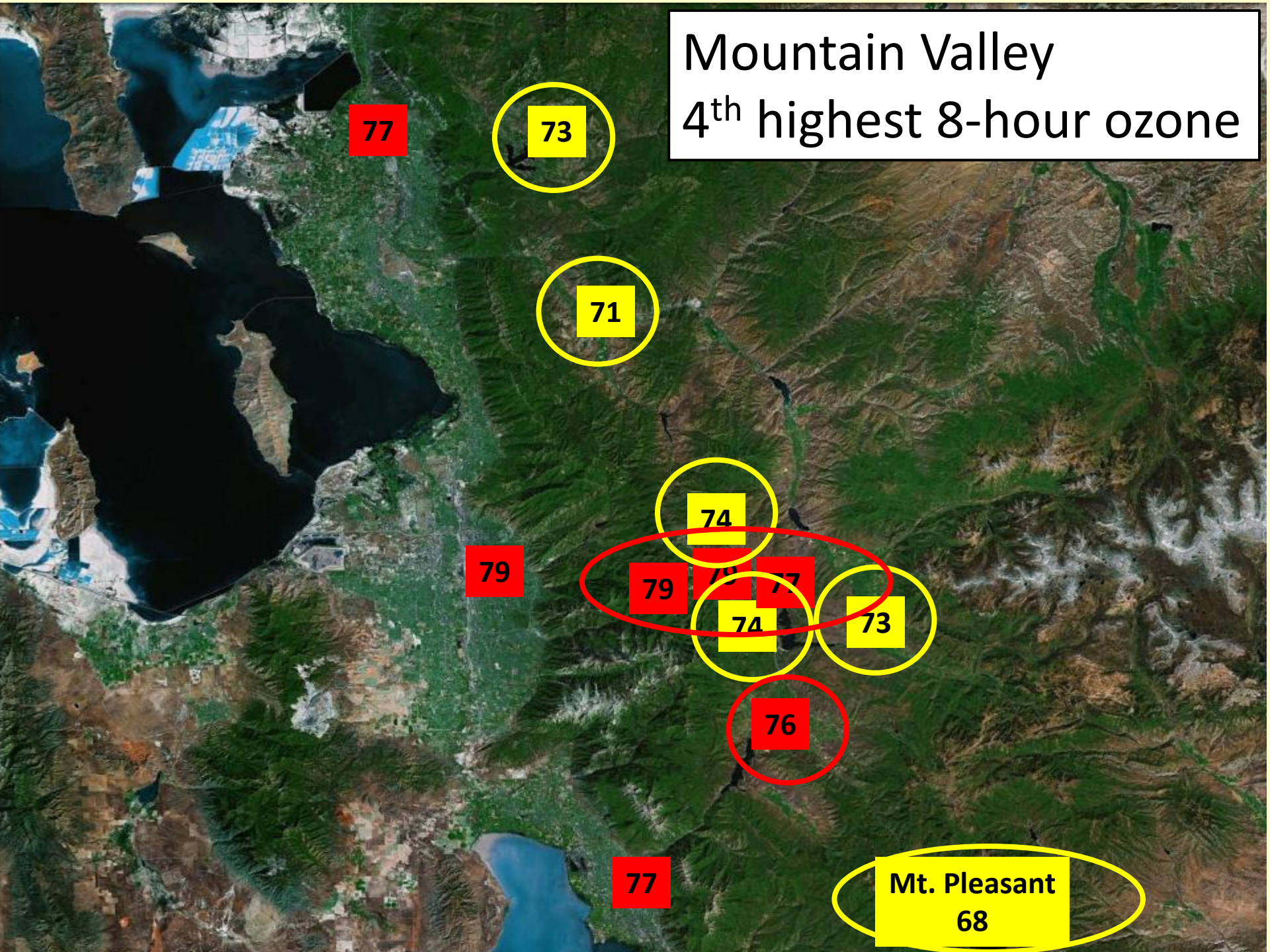
Federal (EPA) Ozone Standard

- Ozone National Ambient Air Quality Standard
  - **NAAQS**
  - **75 ppb**
  - 4th highest, daily maximum, 8-hour average
  - Averaged over 3 years
- 5-Year review of NAAQS
  - EPA *likely* to lower to **60 - 70 ppb**
  - Secondary standard to protect vegetation (W126)

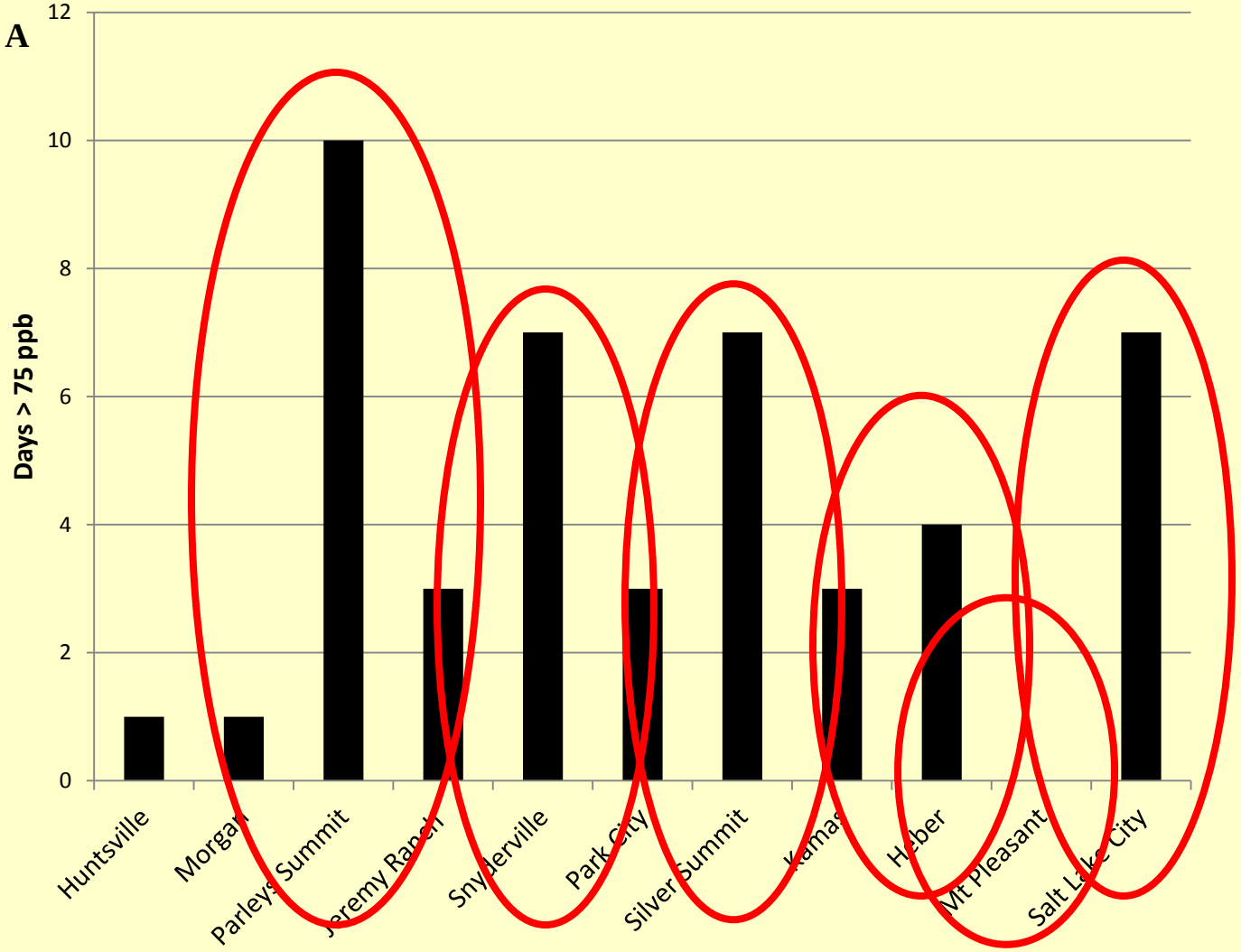
Mountain Valley ozone sites

- Huntsville
- Morgan
- Parleys Summit
- Jeremy Ranch
- Snyderville
- Park City
- Silver Summit
- Kamas
- Heber



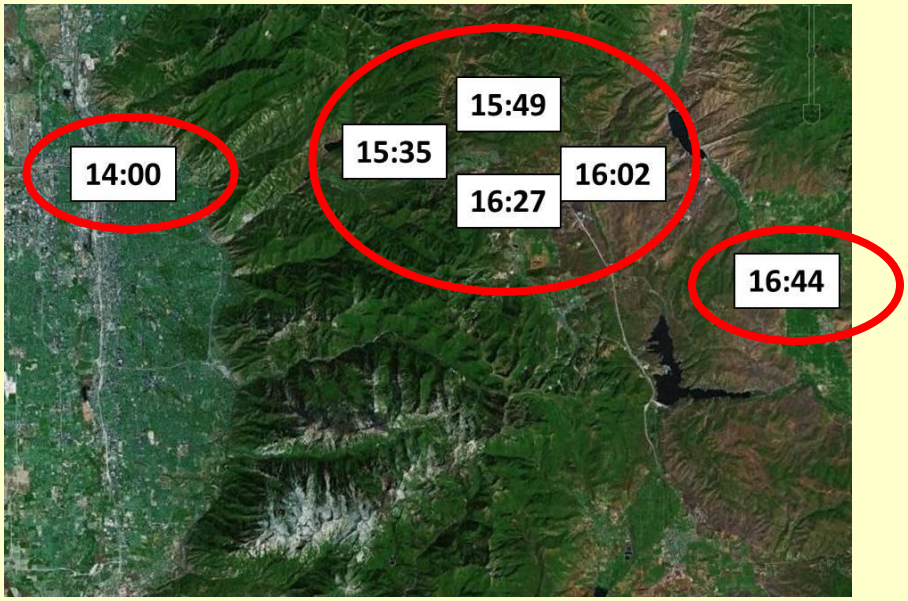

Mountain Valley
4th highest 8-hour ozone
77
73
71
74
79
79
74
73
76
77
Mt. Pleasant
68

Mountain Valley – Days > 75 ppb



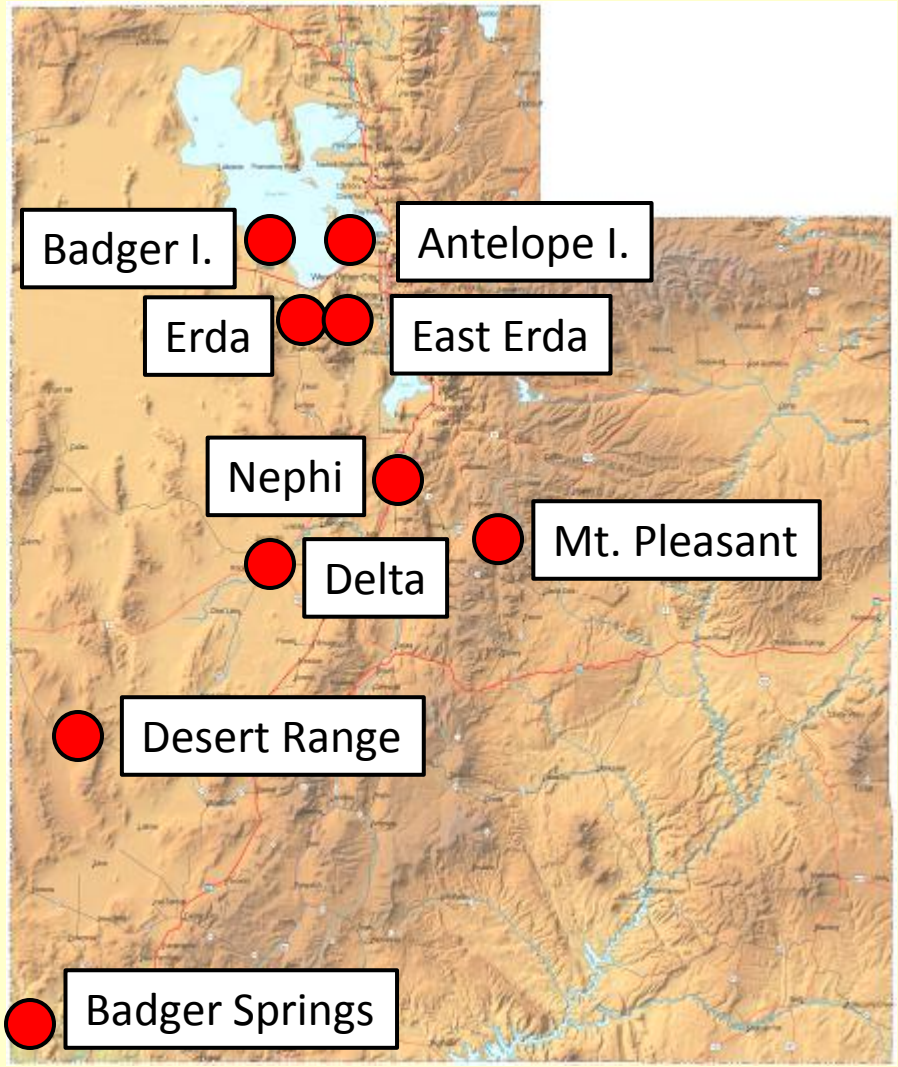
Why high ozone in mountain valleys?

- Transport from SLC
  - Ozone and precursors
  - Wind patterns
  - Timing of ozone peak
  - Jeremy Ranch to Kamas
- Higher solar radiation
  - 57% higher than SLC
- Biogenic VOCs??



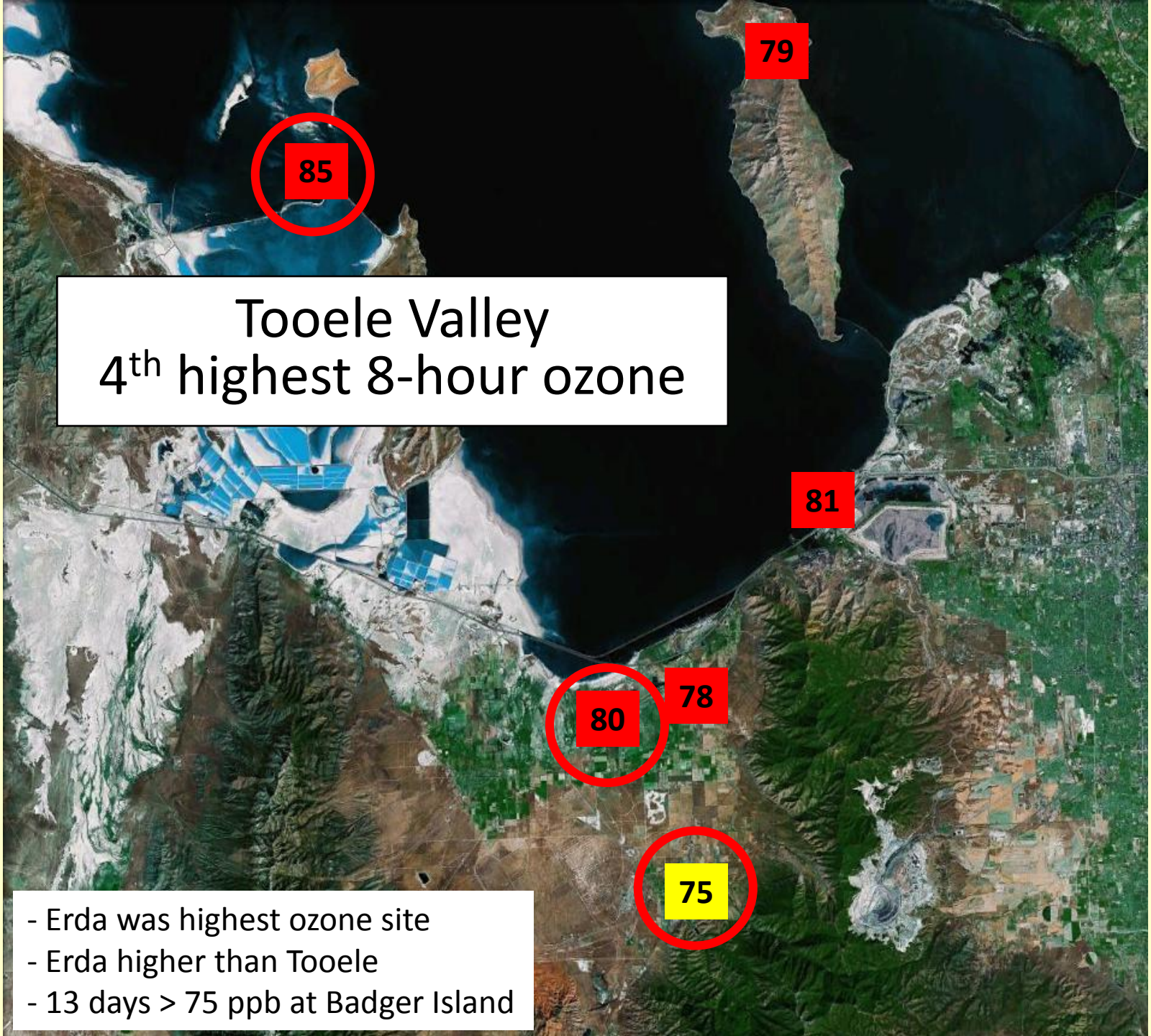
Tooele Valley and rural ozone sites

- Badger Island
- Erda
- East Erda
- Antelope Island
- Mt. Pleasant
- Nephi
- Delta
- Desert Range
- Badger Springs

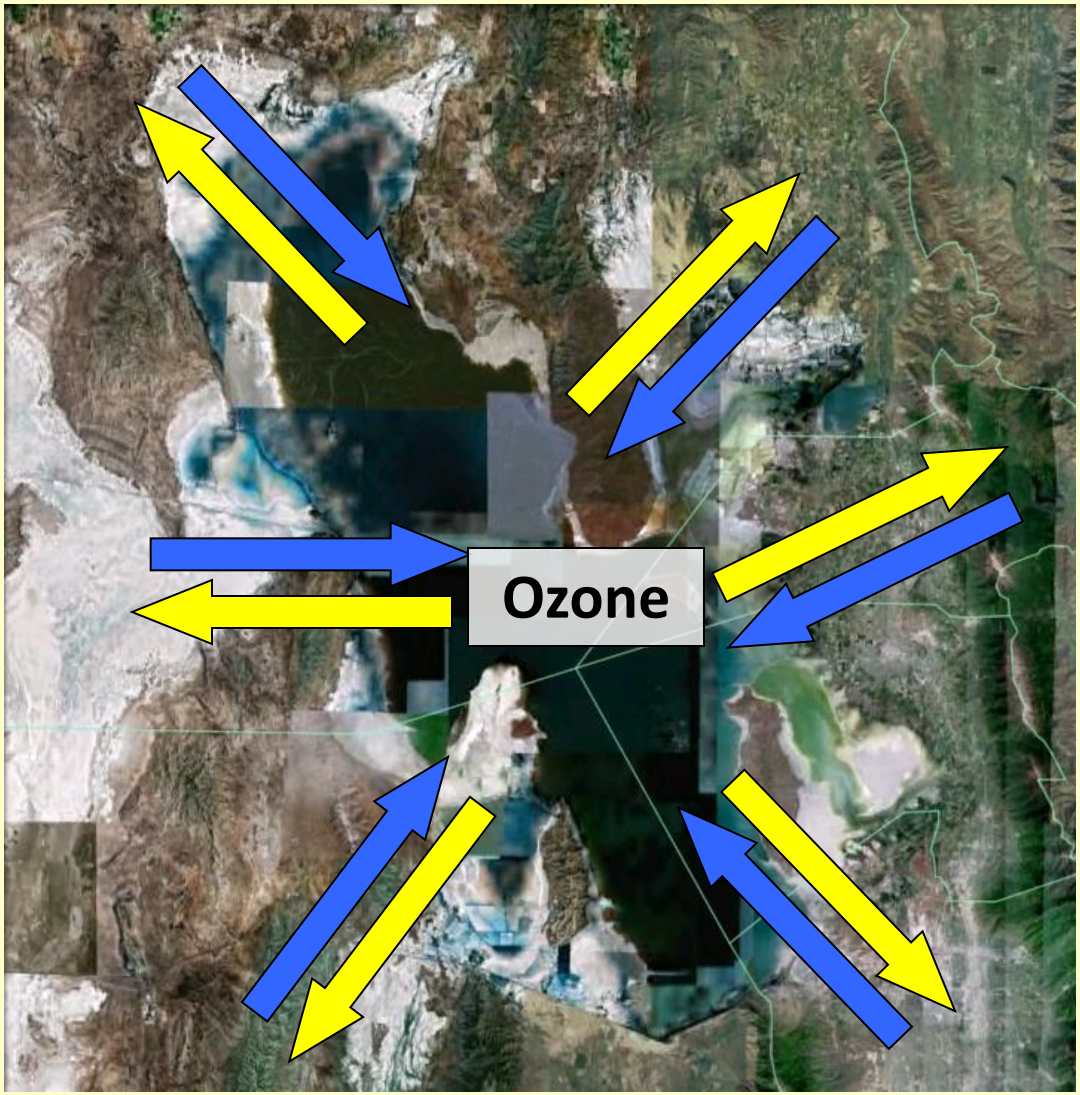


High GSL ozone

- Erda
  - 77 ppb (2010-1012)
  - 6 days > 75 ppb
- Badger Island 2012
  - 13 days > 75 ppb
- Antelope Island 2012
  - 9 days > 75 ppb

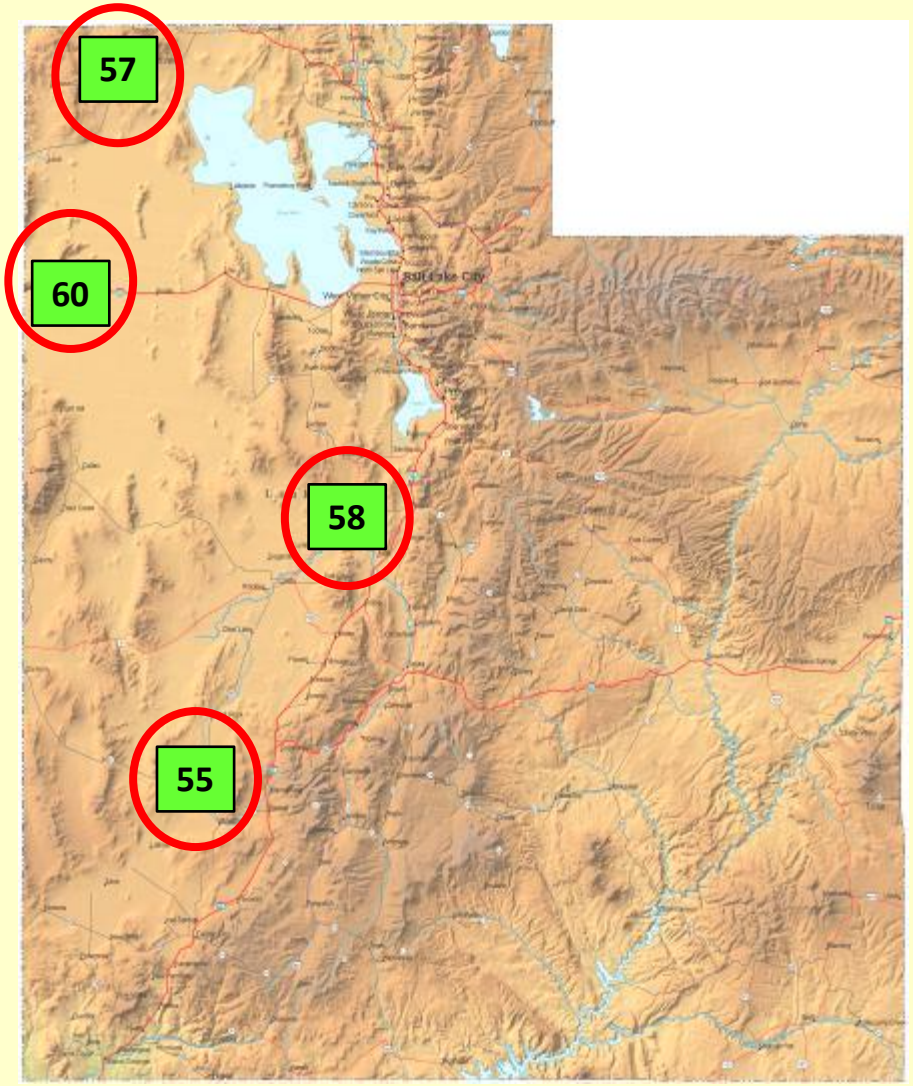

79
85
Tooele Valley
4th highest 8-hour ozone
81
78
80
75
- Erda was highest ozone site
- Erda higher than Tooele
- 13 days > 75 ppb at Badger Island

Great Salt Lake can enhance ozone formation



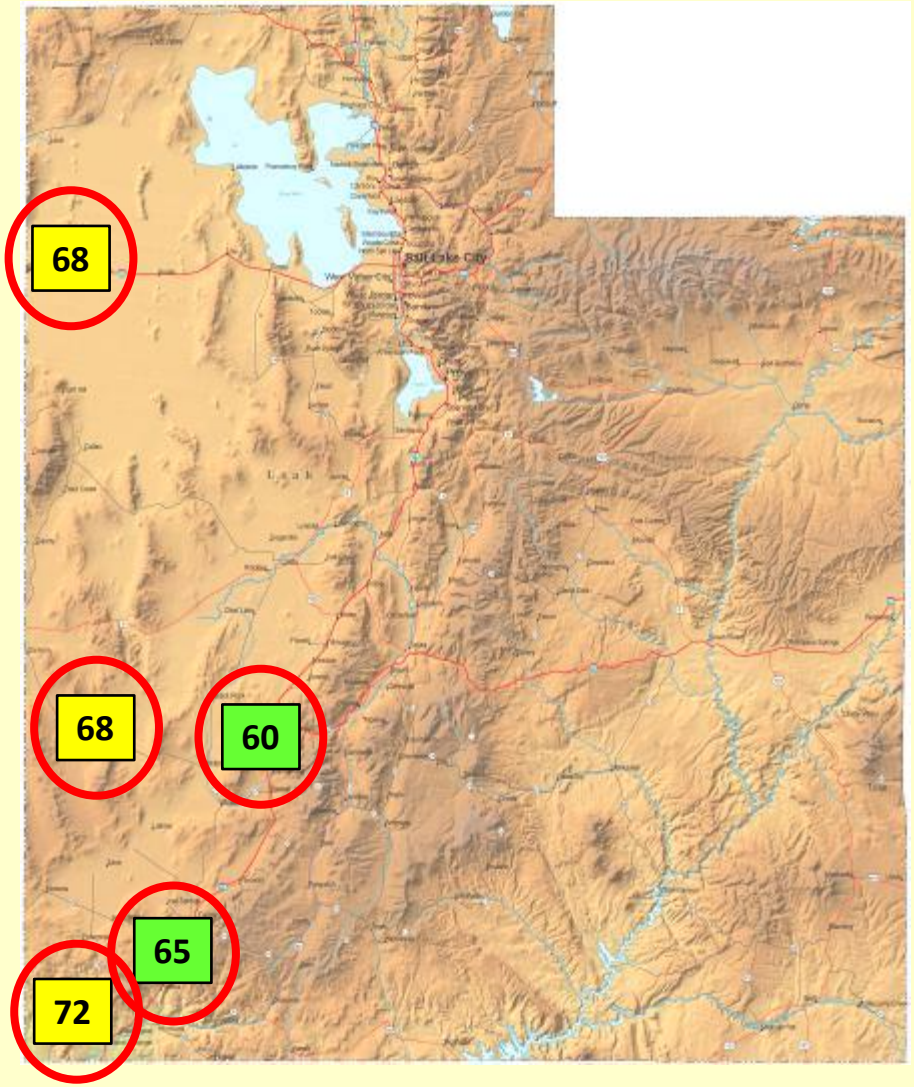
- Ozone forms early in day over lake
  - High albedo
- Morning heating
  - Wind blows away from lake
- Evening cooling
  - Down-canyon winds
  - Higher ozone over lake
- Diurnal pattern remains during high pressure

2010 rural sites
4th highest 8-hour ozone



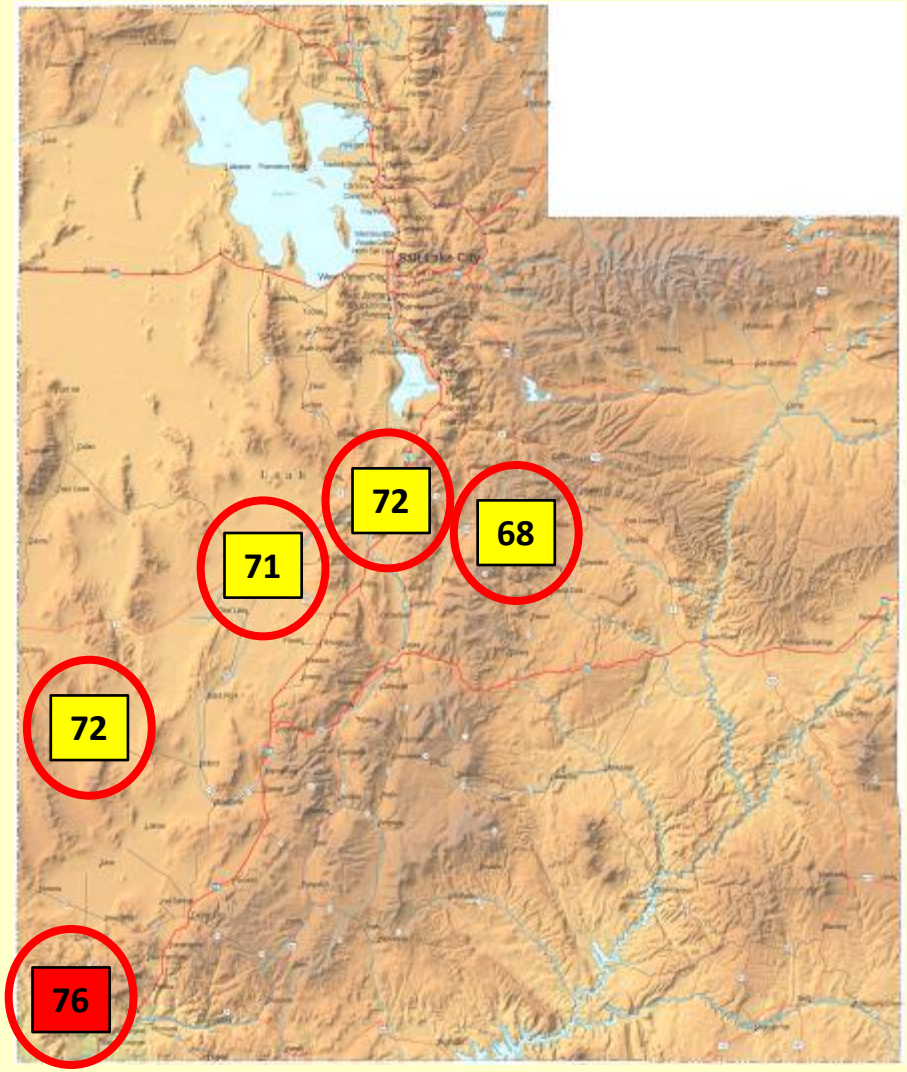
- Low ozone
- Sites:
  - Park Valley
  - Wendover
  - Nephi
  - Milford

2011 rural sites
4th highest 8-hour ozone



- Sites:
  - Filmore
  - New Harmony
  - Wendover
  - Desert Range
  - Western Washington Cty

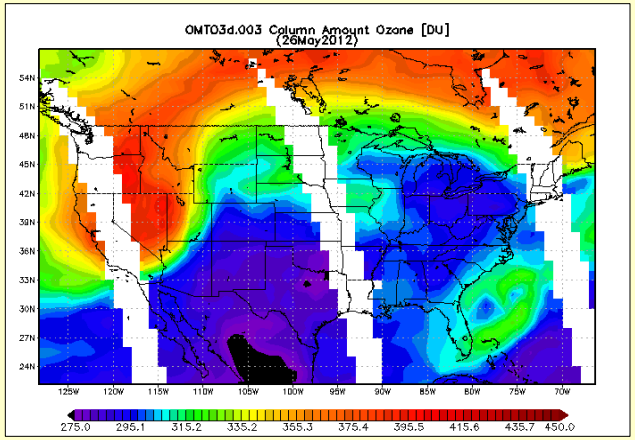
2012 rural sites
4th highest 8-hour ozone



- Moderate to high ozone
- Sites:
  - Mt. Pleasant
  - Nephi
  - Delta
  - Desert Range
  - Western Washington Cty

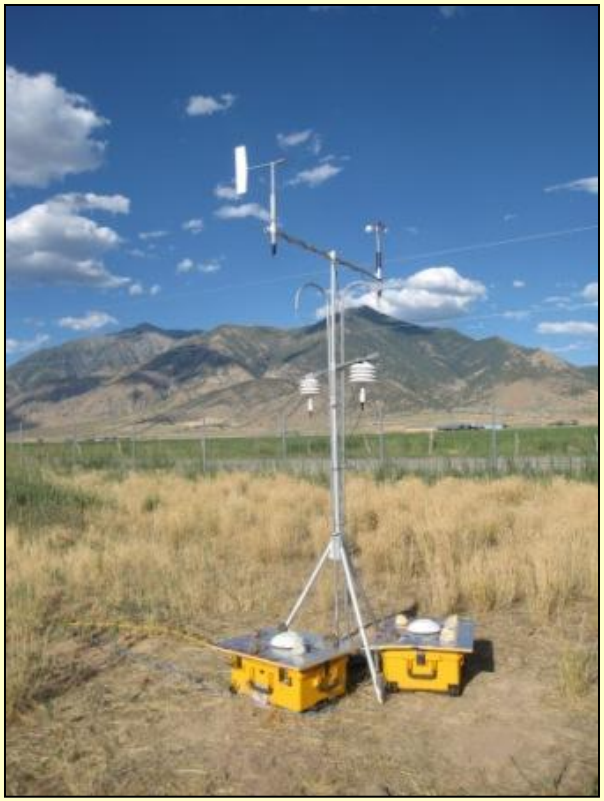
Factors affecting rural ozone

- Regional transport
  - LA, Las Vegas
  - Difficult to pin-point
- Wildfire (2012)
  - Utah fires in June; Idaho fires in July-September
- Stratospheric ozone intrusion
  - Emerging issue
  - 13 days in 2012



Future ozone study

- 2013
  - 5-10 sites
  - Rural and mountain valley sites
- 2014
  - Intensive GSL ozone study
  - SE Utah



Nonattainment area assessment (current NAAQS)

Potential nonattainment

- **Tooele** (77 ppb)
- Summit
- Wasatch
- Washington

Attainment

- Morgan (2 y)
- Western Weber (2 y)
- Western Tooele (2 y)
- Western Box Elder
- Millard (2 y)
- Juab(2 y)
- Beaver
- Sanpete

Nonattainment area assessment (NAAQS = 70 ppb)

Potential nonattainment

- **Tooele** (77 ppb)
- **Summit** (73 ppb)
- Wasatch
- Washington
- Morgan (2 y)
- Eastern Weber (2 y)
- Millard (2 y)
- Juab(2 y)

Attainment

- Western Tooele (2 y)
- Western Box Elder
- Beaver
- Sanpete